Trend Study 18-26-02

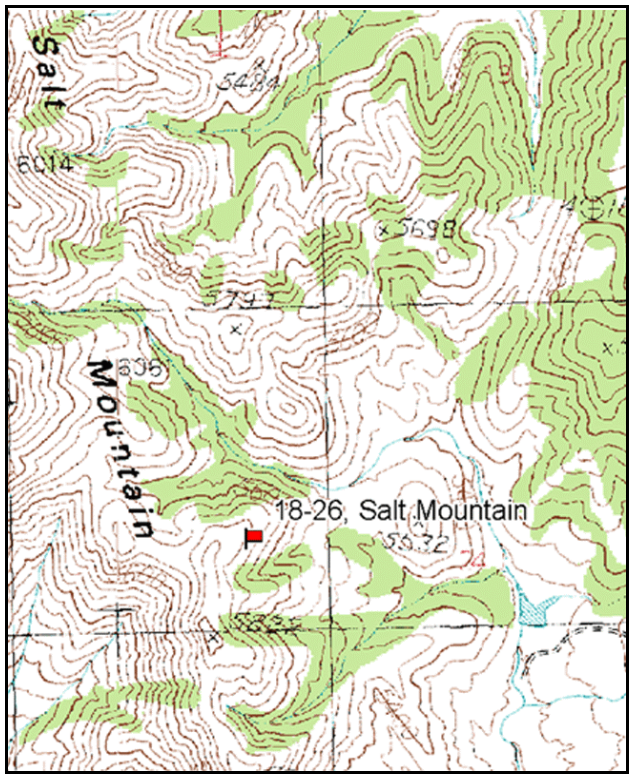
Study site name: Salt Mountain . Vegetation type: Stansbury Cliffrose .

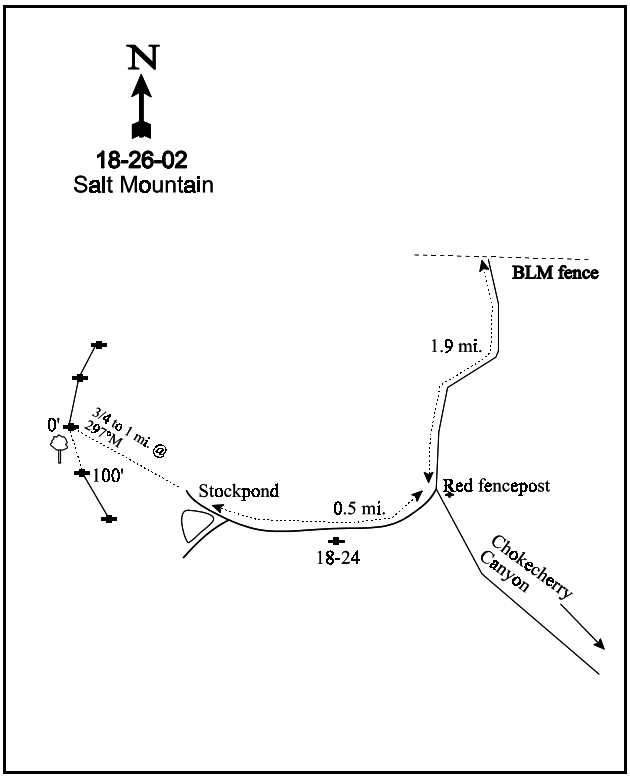
Compass bearing: frequency baseline 0 degrees magnetic (Line 1@ 360°M, line 2 @ 343°M and line 3 @ 205°M).

Frequency belt placement: line 1 (11 & 95), line 2 (59ft), line 3 (71ft), line 4 (34ft).

LOCATION DESCRIPTION

From study site 18-24, continue on the Salt Mountain road for another 0.2 miles to the stock ponds on the east side of the road. From the right fork or road to the north of the stock ponds, walk at 297 degrees magnetic for 0.75 to 1.0 miles to the study area. An old, marked browse study runs along the ridge at the top of this slope, while the trend study is located among the sparse junipers and cliffrose below the ridge. The baseline runs north across the slope. The 0-foot stake is marked with browse tag #169.





Map Name: Salt Mountain

Diagrammatic Sketch

Township 3S , Range 8W , Section 24

GPS: NAD 27, UTM 12S 4489249 N 355739 E

DISCUSSION

Salt Mountain - Trend Study No. 18-26

This trend study, located on the east side of Salt Mountain, samples critical deer winter range within the Stansbury cliffrose range type. The study site lies immediately below a small ridge top on a moderately steep (55%) southeast slope. Elevation is approximately 5,600 feet. There is also a browse transect located within the immediate vicinity of the study. Utilization of the principal browse species was initially moderate to heavy with large numbers of pellet groups present during the 1983 reading. Pellet group data from 2002 estimate moderate deer use at 56 days use/acre (139 ddu/ha). All deer pellet groups appeared to be from winter use.

Soil is weathered in place from dark colored metamorphic rock. Soil depth is moderately shallow and very rocky on the surface. Effective rooting depth was estimated at almost 10 inches in 2002. Due to the shallow depth of the soil, combined with the amount of dark colored rock on the surface, soil temperature was high averaging 74° F at a depth of nearly 10 inches. Litter and vegetation cover are marginal and come principally from cheatgrass. However, erosion is not a significant problem on site and the erosion condition class was determined as stable in 2002.

Browse composition consists of a sparse stand of Stansbury cliffrose, Wyoming big sagebrush, and occasional individuals of spiny horsebrush and Utah juniper. A small population of broom snakeweed is also present. Stansbury cliffrose plants vary in height from about six inches high to individuals well above the reach of deer. However, tall plants are the exception, making most cliffrose foliage available. Cliffrose density was relatively low in 1983 (600/acre), but age structure was indicative of a stable population. Vigor was good even though the level of utilization was moderate to heavy. Between 1983 and 1989, the cliffrose population declined to only 133 plants/acre and all of these were classified as decadent. Use remained moderate to heavy. Density remained stable in 2002 at 120 plants/acre. Utilization was light to moderate with some plants heavily hedged. Dead plants first sampled in 2002, numbered 220 plants/acre, most of which appeared to have died after the 1983 reading. There were many small mature plants sampled which were vigorous and producing flowers and seed. Annual leader growth was good averaging 4.3 inches in 2002. The population appears to be rebounding with 33% of the population consisting of young plants and no decadent plants being sampled.

Wyoming big sagebrush had a low density of about 200 plants/acre in 1983 and 1989. Use was extremely heavy in 1983 and vigor was poor on about one-third of the population. Use was light and vigor good in 1989. Density was estimated at 960 plants/acre in 2002 with the much larger sample. Utilization was light to moderate but vigor was good and decadence low.

Grasses comprise the bulk of herbaceous plants on the site. Cheatgrass, although not included in the 1983 and 1989 samples, was abundant and provided more cover than perennial grasses. In 2002, cheatgrass provided 42% of the total grass cover or 39% of the total herbaceous cover. Perennial grasses occur as scattered bunches within the uniform carpet of cheatgrass. They include bluebunch wheatgrass, Sandberg bluegrass, and Indian ricegrass. Grasses show no evidence of use. Forbs are nearly nonexistent. The few perennial or biennial species which do occur are rare and have little value for forage or watershed protection.

1983 APPARENT TREND ASSESSMENT

Soil condition is poor. Erosion has been heavy, exposing a lot of rock and erosion pavement. Vegetation and litter cover come primarily from cheatgrass, which has only minimal soil holding capabilities. Vegetation trend appears more stable but at a low condition level. The principal browse species, Stansbury cliffrose, is maintaining itself at a low density. Wyoming big sagebrush, the most heavily used plant on the area, appears to be declining. Except for an increasing population of broom snakeweed, the other browse species seem stable. Perennial herbaceous plants are seriously depleted which has resulted in a heavy infestation of cheatgrass and annual mustards. When dry, these are a dangerous fire hazard.

1989 TREND ASSESSMENT

The trend study on Salt Mountain is an example of the mid 1980's shrub die-off that affected different locations within the Great Basin. Cliffrose happens to be the casualty on the east side of this mountain. The Wyoming big sagebrush does not appear to have been as adversely impacted. For cliffrose there are many more dead than live. Density estimates included standing dead shrubs, which numbered approximately 400/acre. Live, mostly decadent, cliffrose have a density of 133/acre. All age classes were affected by the die-off. Over-utilization was not the cause of death. Current browsing on the remaining available parts is moderate to heavy. Some cliffrose are growing out of reach. Those out of reach have good seed production this year, but no seedling or young plants could be found. The sparse population of big sagebrush displays heavy utilization. The severely hedged individuals have a clubbed form, low growth, and no seed production. Smaller sagebrush, such as the few mature shrubs sampled by the density plots, have excellent growth and vigor. The very limited available browse is heavily used, even with moderate deer numbers. This condition is exacerbated by the extended drought since 1985. Observations indicate less cheatgrass on the site in this dry year. The data show an increase in the two species of perennial grass, bluebunch wheatgrass and Sandberg bluegrass. Perennial forbs are almost non-existent, as was the case in 1983. Ground cover is mostly related to the ephemeral cheatgrass. The 1989 reading found less litter, but more vegetative ground cover. There is less bare soil because more rock and pavement is exposed. Soil and rock movement is natural on this steep, shallow, rocky site, but it still indicates a slightly downward soil trend.

TREND ASSESSMENT
soil - slightly downward (2)
browse - slightly downward (2)
herbaceous understory - slightly upward (4)

2002 TREND ASSESSMENT

Trend for soil is stable. Cover of bare ground has increased slightly but the ratio of protective ground cover to bare ground is good for a dry site like this. The soil erosion condition class was determined as stable in 2002. Trend for browse is up. Wyoming big sagebrush has increased in density from 200 plants/acre to 960 plants/acre. Use is mostly light, vigor good and there are few decadent plants. Plants are vigorous with annual leader growth averaging 2 inches. Stansbury cliffrose has maintained a similar density compared to 1989. However, it displays lighter use, good vigor and no decadent plants were sampled. Young plants account for 33% of the population indicating an expanding population. Cliffrose are now vigorous with many plants flowering and producing seeds. Annual leader growth is excellent averaging over 4 inches. Trend for the herbaceous understory is down slightly. Cheatgrass is still abundant, occurring in nearly every quadrat and producing 42% of the total grass cover. Bluebunch wheatgrass and Sandberg bluegrass are the only other grasses on the site. Bluebunch wheatgrass declined significantly in nested frequency while Sandberg bluegrass remained stable. Forbs are rare in their occurrence and provide little forage.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Herd unit 18 , Study no: 26

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'83	'89	'02	'83	'89	'02	'02
G	Agropyron spicatum	$_{a}$183	$_{b}$222	$_{a}$160	75	86	62	6.60
G	Bromus tectorum (a)	-	-	306	-	-	96	8.57
G	Oryzopsis hymenoides	1	-	-	1	-	-	-
G	Poa secunda	$_{a}$73	$_{b}$198	$_{b}$224	37	76	80	5.32
Total for Annual Grasses		0	0	306	0	0	96	8.57
Total for Perennial Grasses		257	420	384	113	162	142	11.93
Total for Grasses		257	420	690	113	162	238	20.51
F	Agoseris glauca	-	4	-	-	2	-	-
F	Allium spp.	-	4	3	-	2	2	.02
F	Calochortus nuttallii	1	-	-	1	-	-	-
F	Cirsium neomexicanum	4	-	-	4	-	-	-
F	Delphinium nuttallianum	-	1	-	-	1	-	-
F	Erodium cicutarium (a)	-	-	67	-	-	26	1.22
F	Gilia spp. (a)	-	-	1	-	-	1	.00
F	Lappula occidentalis (a)	-	-	4	-	-	2	.01
F	Lactuca serriola	-	8	2	-	3	2	.01
F	Ranunculus testiculatus (a)	-	-	10	-	-	4	.02
F	Senecio spp.	2	-	-	1	-	-	-
Total for Annual Forbs		0	0	82	0	0	33	1.25
Total for Perennial Forbs		7	17	5	6	8	4	0.02
Total for Forbs		7	17	87	6	8	37	1.28

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 18 , Study no: 26

Type	Species	Strip Frequency	Average Cover %
		'02	'02
B	Artemisia tridentata wyomingensis	28	3.55
B	Cowania mexicana stansburiana	6	.21
B	Gutierrezia sarothrae	1	-
B	Juniperus osteosperma	2	2.23
B	Opuntia spp.	4	.15
B	Tetradymia canescens	0	.18
Total for Browse		41	6.32

CANOPY COVER -- LINE INTERCEPT
Herd unit 18 , Study no: 26

Species	Percent Cover '02
Artemisia tridentata wyomingensis	4.42
Cowania mexicana stansburiana	2.42
Gutierrezia sarothrae	.08
Juniperus osteosperma	2.58
Tetradymia canescens	.03

Key Browse Annual Leader Growth
Herd unit 18 , Study no:26

Species	Average leader growth (in) '02
Artemisia tridentata wyomingensis	1.9
Cowania mexicana stansburiana	4.3

Point-Quarter Tree Data
Herd unit 18 , Study no: 26

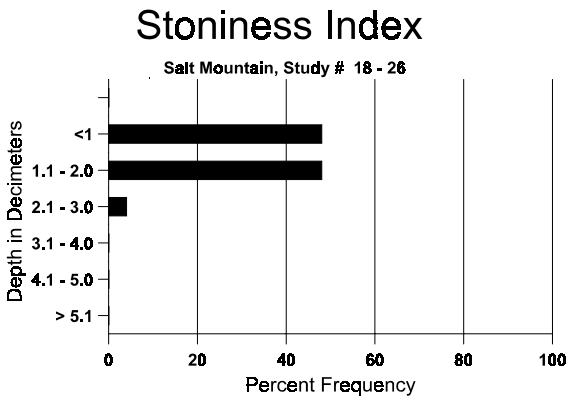
Species	Trees per Acre '02	Average diameter (in) '02
Juniperus osteosperma	42	8.5

BASIC COVER --
Herd unit 18 , Study no: 26

Cover Type	Nested Frequency '02	Average Cover % '83	'89	'02
Vegetation	353	.50	10.75	29.36
Rock	304	19.00	8.50	16.42
Pavement	303	15.50	33.25	7.93
Litter	361	41.75	34.50	30.76
Cryptogams	184	5.00	.50	5.21
Bare Ground	288	18.25	12.50	18.84

SOIL ANALYSIS DATA --
Herd Unit 18, Study no: 26, Salt Mountain

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
8.6	73.8 (9.6)	7.4	47.3	20.7	32.0	1.7	6.0	156.8	0.7



PELLET GROUP FREQUENCY --
Herd unit 18 , Study no: 26

Type	Quadrat Frequency '02	Pellet Transect	
		Pellet Groups per Acre ⅈ02	Days Use per Acre (ha) ⅈ02
Rabbit	19	-	-
Deer	17	731	56 (139)

BROWSE CHARACTERISTICS --
Herd unit 18 , Study no: 26

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	83	-	-	4	-	-	-	-	-	-	2	1	1	-	133	12	17	4
	89	4	-	-	-	-	-	-	-	-	4	-	-	-	133	15	16	4
	02	23	10	-	1	5	-	-	-	-	39	-	-	-	780	22	31	39
D	83	-	-	2	-	-	-	-	-	-	1	-	1	-	66			2
	89	-	-	-	2	-	-	-	-	-	-	2	-	-	66			2
	02	2	1	-	1	-	-	-	-	-	4	-	-	-	80			4
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	100%	33%	+ 0%
'89	00%	00%	00%	+79%
'02	33%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	199	Dec:	33%
	'89	199		33%
	'02	960		8%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Cowania mexicana stansburiana																		
Y	83	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	83	-	9	5	-	-	-	-	-	-	13	-	1	-	466	56	47	14
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	2	1	1	-	-	-	-	-	-	4	-	-	-	80	50	57	4
D	83	-	-	1	-	-	-	-	-	-	-	-	1	-	33			1
	89	-	3	1	-	-	-	-	-	-	4	-	-	-	133			4
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	50%	33%	11%	
'89	75%	25%	00%	-78%
'02	17%	17%	00%	-10%

Total Plants/Acre (excluding Dead & Seedlings)				
'83	599	Dec:		6%
'89	133			100%
'02	120			0%

Gutierrezia sarothrae																		
Y	83	20	-	-	-	-	-	-	-	-	20	-	-	-	666			20
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	22	-	-	-	-	-	-	-	-	21	-	1	-	733	14	16	22
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	100	8	12	3
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60	13	19	3
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	02%	
'89	00%	00%	00%	-93%
'02	00%	00%	00%	-40%

Total Plants/Acre (excluding Dead & Seedlings)				
'83	1399	Dec:		-
'89	100			-
'02	60			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	1	-	-	-	1	-	2	-	-	-	40	-	-	2
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'02	40		-

Opuntia spp.																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	11	4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'02	80		-

Tetradymia canescens																		
M	83	3	-	-	-	-	-	-	-	-	3	-	-	-	100	22	30	3
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33	22	23	1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	51	0
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	2	-	-	-	-	-	-	-	-	1	-	1	-	66			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	- 1%
'89	00%	00%	33%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	100	Dec:	0%
	'89	99		67%
	'02	0		0%